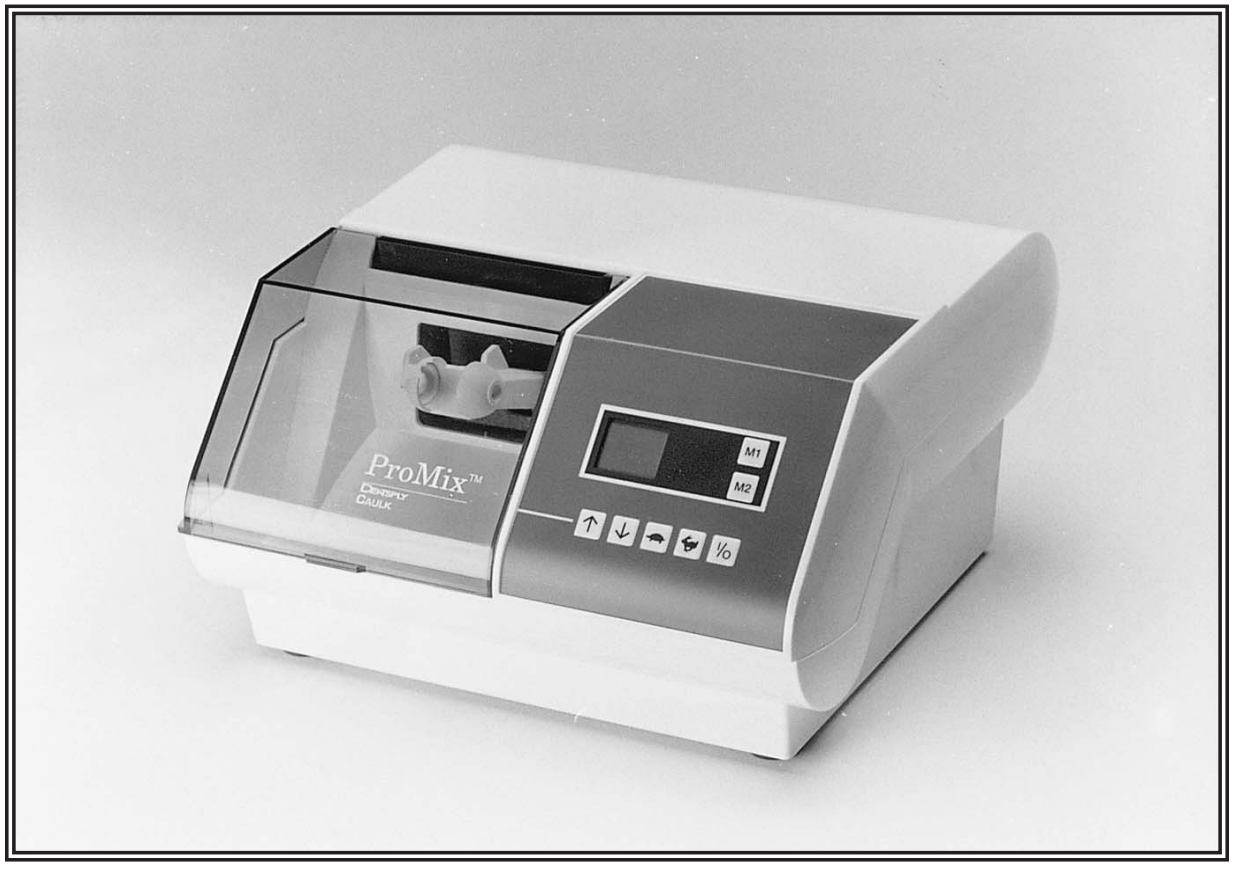
REPAIR GUIDE

MODEL 400
MODEL 401
MODEL 402

the ProMix™

AMALGAMATION UNIT

DENTSPLY


ProMix™
DENTSPLY
CAULK
M1
M2

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SECTION I

TECHNICAL DETAILS & SPECIFICATIONS

1.1 Technical Details:

AC INPUT RATING:	Model 400	120V, 60Hz, 2.0A
	Model 401	230V, 50/60Hz, 1.0A
FUSE RATING:	Model 400	F2.0A /250V
	Model 401	F1.6A/250V
MOTOR RATING:	115VAC, 60Hz	
PRESET MOTOR SPEEDS:	Low (Turtle)	3700±200 rpm
	High (Rabbit)	4200±200 rpm
IEC EQUIPMENT CLASS:	Class I	
INSTALLATION CATEGORY (OVER VOLTAGE CATEGORY):	II	
POLLUTION DEGREE:	2	
OPERATION MODE:	Continuous (Under normal usage conditions)*	

1.2 Operating Environment:

NOTE: Equipment not suitable for use in the presence of the flamable anaesthetic mixture with air or with nitrous oxide.

Operating Temperature:	10 to 40C
Relative Humidity:	30 to 75 % noncondensing
Atmospheric Pressure:	700 to 1060 hpa

1.3 Dimensions:

Height:	5 inches (12.7 cm)
Width:	9 inches (22.86 cm)
Length:	9.5 inches (24.13 cm)
Weight:	7 pounds(3.18 Kg)
Power Cord Length:	117.6 inches (300 cm)

* According to ANSI/ADA Standard No. 43-1986: 10 seconds on/110 seconds off (normal usage)

SECTION II

GLOSSARY OF SYMBOLS

_____ Attention, Consult Accompanying Documents

_____ Alternating Current

_____ Protective Earth

_____ OFF (Power: Disconnection from the Mains)

_____ ON (Power: Connection to the Mains)

SECTION III

SAFETY PRECAUTIONS

1. Operate the ProMix™ only on a hard, flat surface away from countertop edges.

2. The translucent acrylic arm cover/door of the ProMix™ has a safety interlock switch. Do not attempt to override the switch and/or operate the ProMix™ with this door open.

3. Should the ProMix™ get damaged in any way, do not attempt to operate the unit unless thoroughly inspected and serviced by qualified Dentsply Dealer Service personnel.

4. In cases where a patient or user of the ProMix™ has been fitted with an implanted heart pacemaker and has been cautioned against the use of small electrical appliances (such as electric shavers, hair dryers, etc.) we recommend that the ProMix™ not be used.

5. **DO NOT IMMERSE UNIT, POWER CORD OR PLUG IN WATER.**
   See Cleaning instructions on page (7).

SECTION IV

GENERAL DESCRIPTION

4.0

The microprocessor controlled ProMix™ is one of the most advanced amalgam mixer systems presently available in the dental marketplace.

The ProMix™ Amalgamation Unit provides:

a) **Two Preset Speeds** with an LED indicating the Low speed (3700 rpm) and an LED indicating the High speed (4200 rpm).

b) **Two Memory Locations (M1 and M2)** which can be programmed for time and mixing speed of your two most commonly used amalgam materials (to the manufacturers specifications).

c) A **Timer** to set the run cycle to a maximum of 30 seconds in 1 second increments for both speeds.

d) A **Digital Display** for convenient viewing of timing functions.

e) A **Unique Capsule Holder** (arm assembly) which will accommodate a large variety of today's commonly used capsules (including those with nozzles)

f) A **Safety Switch** which automatically turns OFF the run cycle should the ProMix™ cover accidentally be opened.

g) A **Thermally Protected Motor** to prevent any possible damage caused by overheating.

h) **Cycle Interrupt Capability** to eliminate amalgam waste should the timer be set longer than required.

5.0 INSTALLATION

NOTE: Upon receiving the ProMix™ system check the packaging and parts for any damage that may have occurred in transit. If damage is apparent, please contact your dealer immediately.

Unit Power-up (Initialization):

Plug the detachable power cord into the back of the unit and then to the mains supply.

NOTE: Always use the unit in conjunction with a properly grounded outlet.

Activate the Power Switch on the back of the unit.

Upon the application of AC power, the unit shall always be initialized as follows:

- the Display Board shall read **"00"**,
- the motor shall be OFF,
- the **"LOW"** motor speed shall be selected and the **"LOW"** LED indicator shall be ON.

NOTE: AC power interrupts and degradation causing improper operating voltages to the microprocessor shall always result in a microprocessor master reset and re-Initialization of the unit.

Definition of Terms:

Initialization: is the function performed by the software of the unit after power up or master reset.

Stand-By: is the condition when the unit is not performing the amalgamation cycle but has completed the "initialization" period.

Run: is the condition when the unit is performing the amalgamation cycle.

5.1 OPERATION

The operation of the ProMix™ can be controlled by the LCD display and the seven (7) push buttons/pads located on the front panel.

Display Board — Indicates the set (desired) amalgamation cycle/run time and counts down to **"00"** in 1 second intervals during operation.

"Up" arrow — Increments the programmed run time in one second intervals (to a maximum of 30 seconds).

"Down" arrow — Decrements the programmed run time in one second intervals.

"High" (rabbit) — Selects the high amalgamation speed (4200 rpm) and the associated LED indicator.

"Low" (turtle) — Selects the low amalgamation speed (3700 rpm) and the associated LED indicator.

"Start/Stop" (I/O) — Initiates and deactivates the amalgamation cycle.

NOTE: — **The two (2) "memory" locations are set at the factory to commonly used settings. To change the settings to suit individual needs see "Setting Memory Locations" (page 4).**

"M1" (Memory #1) — Stores and recalls #1 preprogrammed amalgamation speed and time, even in the "power OFF" condition.

NOTE: The Memory #1 location is factory set to 15 seconds at Low speed.

"M2" (Memory #2) — Stores and recalls #2 preprogrammed amalgamation speed and time, even in the "power OFF" condition.

NOTE: The Memory #2 location is factory set to 20 seconds at High speed.

SECTION VI

SERVICE AND MAINTENANCE

6.1 SERVICE

Questions concerning the operation, repair or servicing of this unit should be forwarded to the nearest Dentsply representative or the service department.

6.2 CLEANING

NOTE: Disconnect the power cord from the ProMix™ unit prior to cleaning.

The ProMix™ Amalgamator Unit may be cleaned with a Sani-Cloth™ or a soft cloth dampened with ProCide™ Spray. Do not use other sterilization solutions on the unit. Remember to reconnect the power cord to the ProMix™ unit when cleaning process is complete.

SECTION VII

TROUBLESHOOTING GUIDE

7.1 TROUBLE SHOOTING QUICK CHECK

NOTE: THIS UNIT HAS CMOS COMPONENTS WHICH MAY BE SUBJECT TO ELECTROSTATIC DAMAGE (ESD). WORKSTATION MUST BE PROPERLY GROUNDED AND THE REPAIR PERSON SHOULD GROUND THEMSELVES PRIOR TO HANDLING.

Before opening the unit for servicing, see if the problem can be corrected by checking the following:

1) Power cord is securely connected into an outlet that supplies the proper voltage rating, and the outlet has been turned on.
2) The power cord is fully and securely inserted into the A/C receptacle of the power unit.
3) The ON/OFF power switch at the back of the unit is turned on. (Depressed “I” position)

If the above checks fails to correct the problem, see the following trouble shooting-guide for the failure mode and corresponding repair procedure.

7.2.1

Display Board does not come on when main switch at the back of the unit is turned on.

Possible Problem	**Solution**
A. Loose Lead Wires	Open unit and check for loose lead wire connections between the A/C receptacle, main power switch Fig (1a), and the power supply. See Fig 1b.
B. Blown Fuse	Check fuses. See Fig 1b. If open replace with the same type fuse. See fuse rating section 1.1.

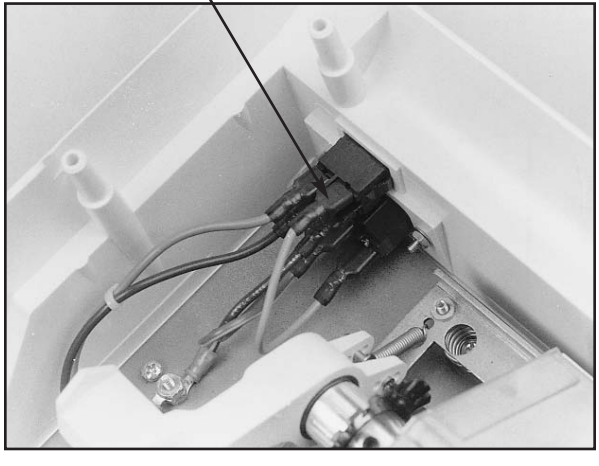

Figure 1a

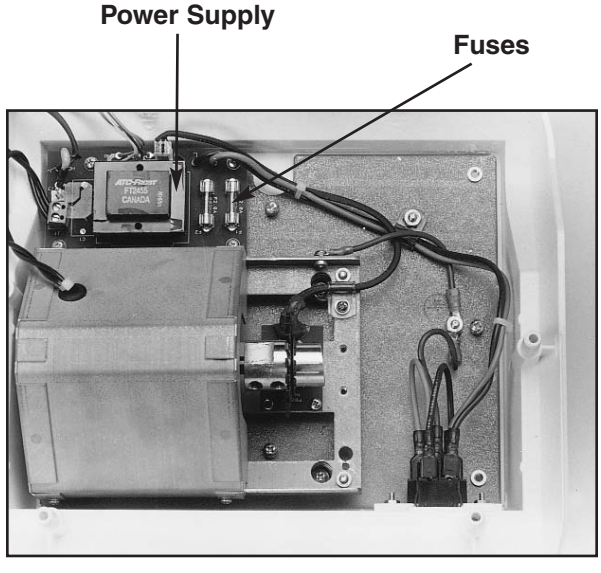

Figure 1b

C. Power Supply

Locate CPU Board (Fig 1d) and disconnect connector J1 (Fig 1d). Locate power supply (Fig 1c). Measure voltage between the wire connection marked ac- and ground marked gnd (See Fig 1c). This voltage should be greater than 7V a.c.. Repeat for the wire connection marked ac+ and gnd. If either is zero or less than 7V a.c., replace the power supply.

D. C.P.U. Board

Identify C.P.U. board as shown in Fig 1d. Locate voltage regulator (VR1) see Fig 1e.. Measure voltage between pin 2(gnd) and 3. If voltage is less than 4V d.c.. Check voltage between pin 1 and pin 2 (gnd). If greater than 7V d.c., replace C.P.U. board.

E. Display Board

If 7.2.1 A to D fail to correct problem replace display board (Fig 1f).

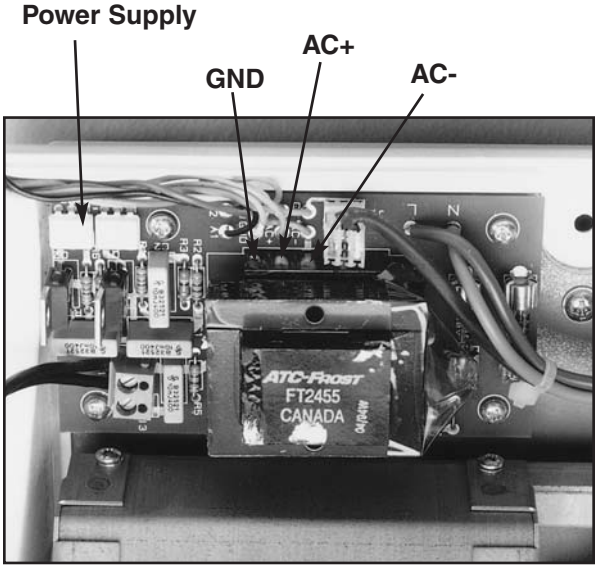

Figure 1c

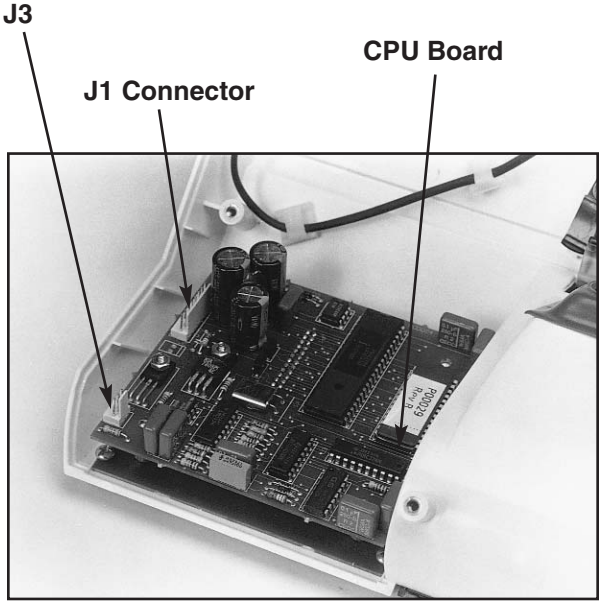

Figure 1d

7.2.2

Display Board activates but switches are inactive.

Possible Causes	Solutions
A. Power Supply	See para 7.2.1 C
B. C.P.U. Board	See para 7.2.1.D
C. Display Board	If 7.2.2. A and B fail to correct problem replace Display Board (Fig 1f)

7.2.3

Display Board Up(') / Down(‘) keys operate properly, but on/off key activation does not start the unit.

Possible Causes	Solution
A. Door switch cable connections (Model 400, 120v)	Locate power supply (Fig 1c). Check for loose or open connections to J3 (Fig 3a). If loose in connector, press into connector to insure proper contact. If the problem persists replace door switch cable assembly.

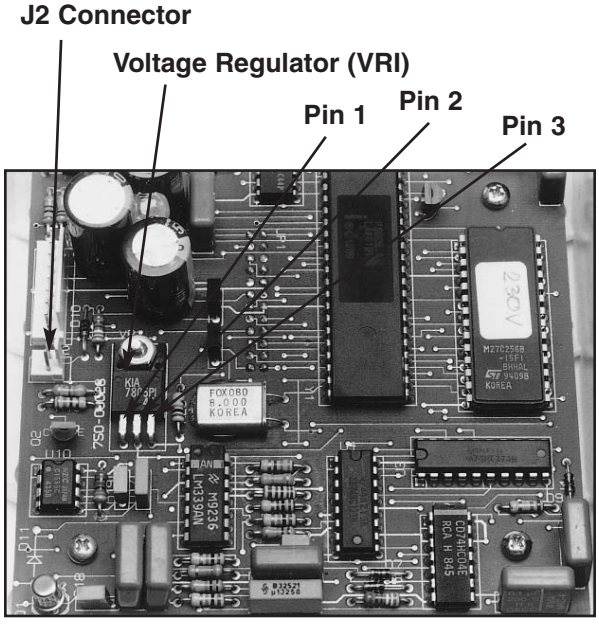

Figure 1e

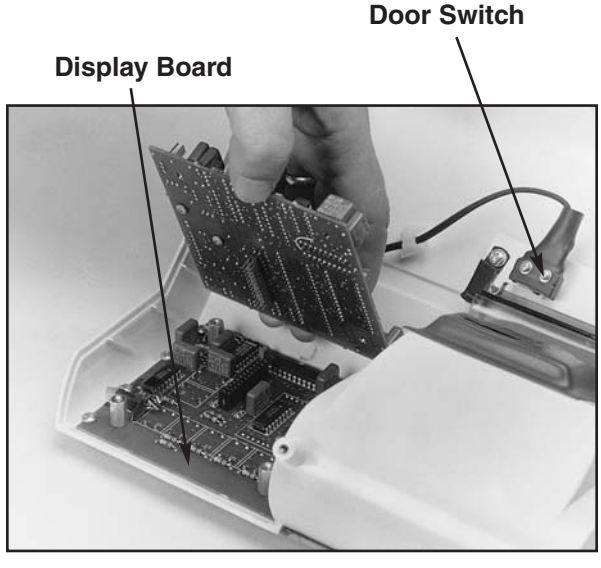

Figure 1f

B. Door switch cable connections (Model 401, 402, 230v)	Locate CPU board (Fig 1d). Check for loose or open connections to J2 (Fig 3b). If loose in connections, press wires into connector to insure good contact. If the problem persists, replace door switch cable assembly.
C. Door switch	Locate door switch (Fig 1f). On connector at the end of the cable (see 7.2 3a or 3b) apply ohmmeter to both connectors and ensure that the switch functions when the door is opened and closed. If the problem persists, change the switch.
D. Motor Connections	Locate motor wire terminal block (Fig 3a). Check that connections are secure and that the screws are tight. If they are secure measure the voltage across the terminal block while depressing the on/off key. If this voltage is above 70v a.c., replace motor base assembly.
E. CPU board	If voltage is not above 70 v a.c. replace CPU board.
F. Display Board	If the above fails to solve the problem replace the display board.

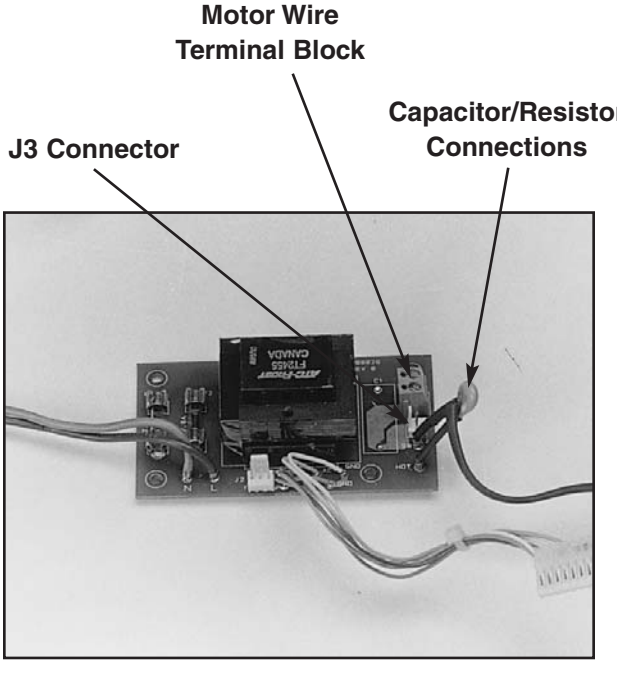

Figure 3a

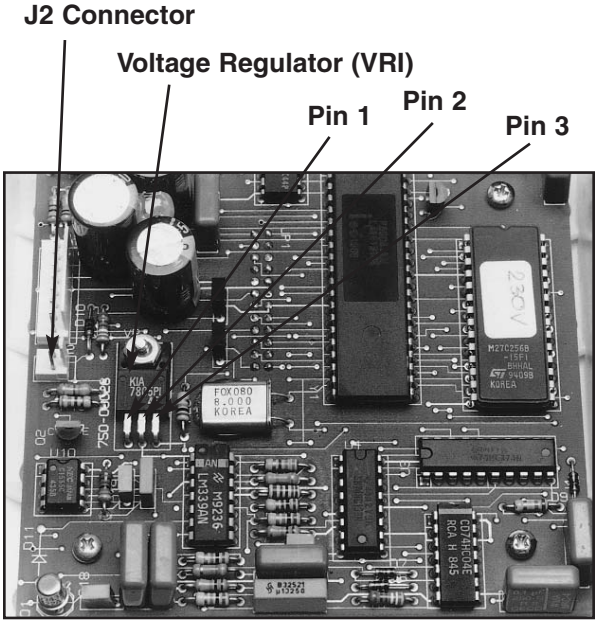

Figure 3b

7.2.4

Motor speeds up and stops immediately after turned on, All other keys function properly.

Possible Problem	Solution
A. Optical detector board assembly	Locate optical detector board (Fig 4a). Check for broken wires in cable to power supply. If broken or intermittent, replace optical detector board assembly.
B. Optical detector	If problem still exists clean the inside slot of the optical detector board assembly.
C. Power supply	See para 7.2.1. C
D. CPU board	See para 7.2.1. D
E. Display board	If all the above does not solve the problem replace the display board.

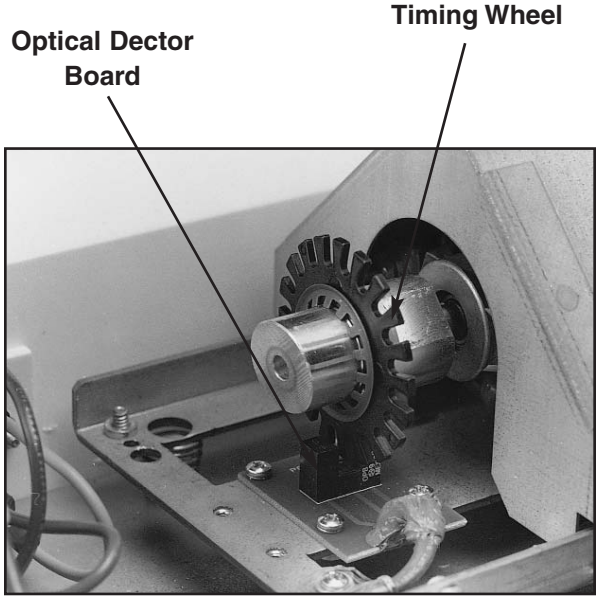

Figure 4a

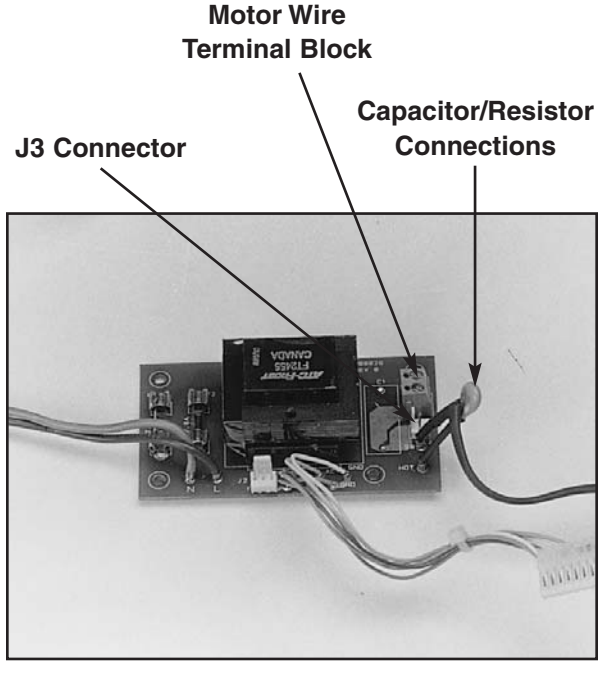

Figure 5a

7.2.5

Motor speed is inconsistent.

Possible Problem	Solution
A. Loose wires	Locate power supply (Fig 1c). Check for loose or broken capacitor/ resistor connections in cable assembly (Fig 5a). If broken, replace assembly.
B. Optical Detector	Refer to 7.2.4. B
C. Timing wheel	Locate timing wheel (Fig 4a.). Make sure the timing wheel has not changed location. This would cause the wheel to cut the optical board (4a). If this has happened, change the optical board and realign the timing wheel.
D. CPU Board	If speed is still inconsistent, replace the CPU Board.

7.2.6

Memory buttons MT1 and MT2 does not store the programmed value after power is off.

Possible Problem	Solution
A. CPU board	Replace CPU board.

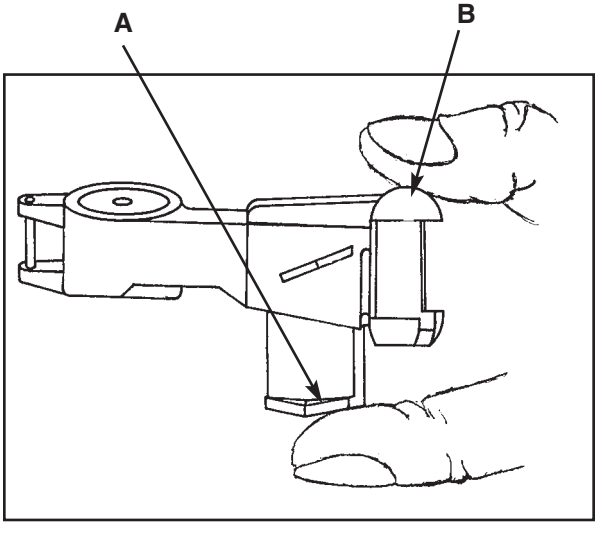

Figure 5b

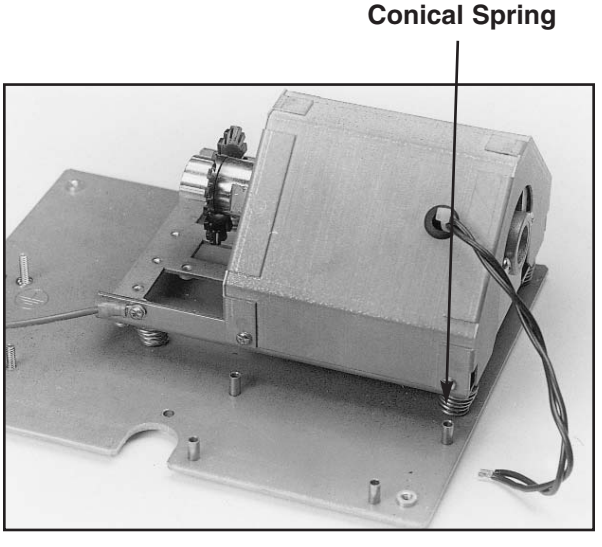

Figure 6a

MECHANICAL FAILURES

7.3.1

Capsule remains locked in arm.

Possible Problem	Solution
A. Arm release	Locate the arm release mechanism Fig 5b. and press A and B together repeatedly in the direction of the arrows.

7.3.2

Unit moves from vibration during operation.

Possible Problem	Solution
A. Broken or loose conical springs	Open the unit and check the conical springs located in Fig. 6a. If a spring is broken or loose, replace motor assembly. (see assembly/disassembly)

7.3.3

Capsule arm drops and hits the window during operation.

Possible Cause	Solution
A. Broken tail spring	Locate the tail spring (Fig 6b). Cut tail spring in half and change. Never reuse tail spring.

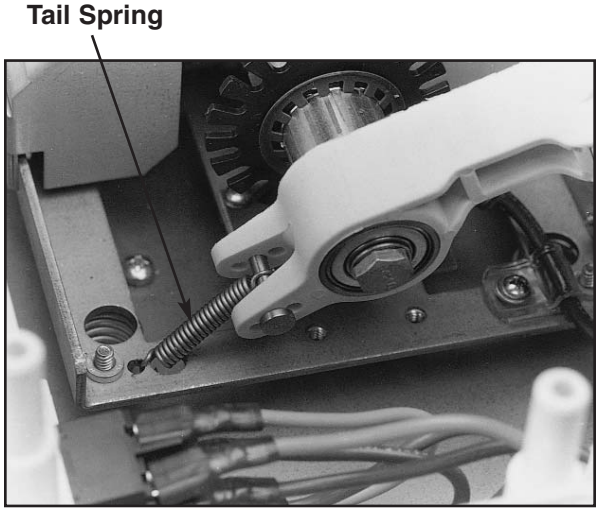

Figure 6b

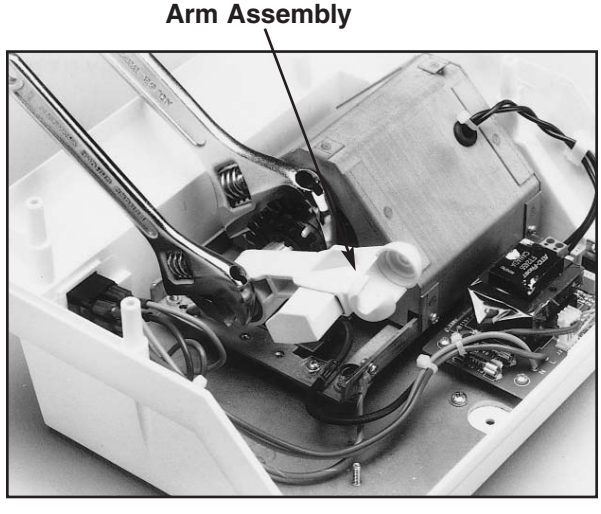

Figure 6c

7.3.4

Arm opens and does not hold capsule.

Possible Cause	Solution
A Broken arm	Replace arm assembly (Fig 6c). See assembly/disassembly.

7.3.5

Rubber boot falls off.

Possible Cause	Solution
A. Glue bond is broken	Glue the boot back to plastic using Loctite Super bonder 498 (Fig 8.2).

7.3.6

Window makes noise during operation.

Possible Cause	Solution
A. Tension of the window has decreased.	Locate the tension springs and switch plate (Fig 6d). Change the tension springs, switch plate and the window cover.

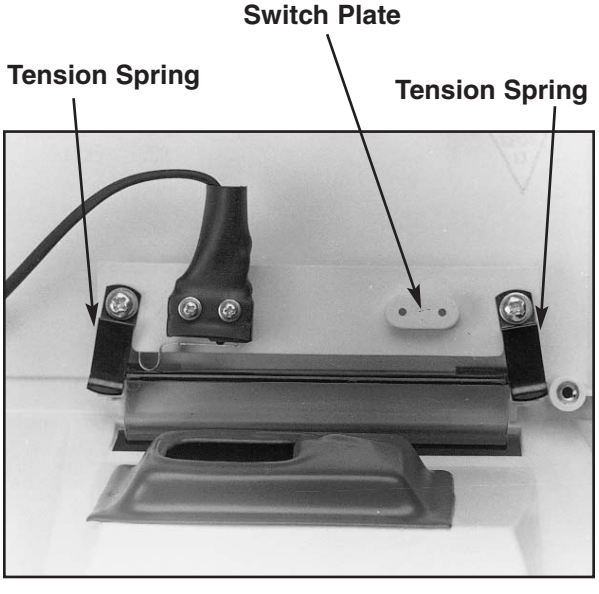

Figure 6d

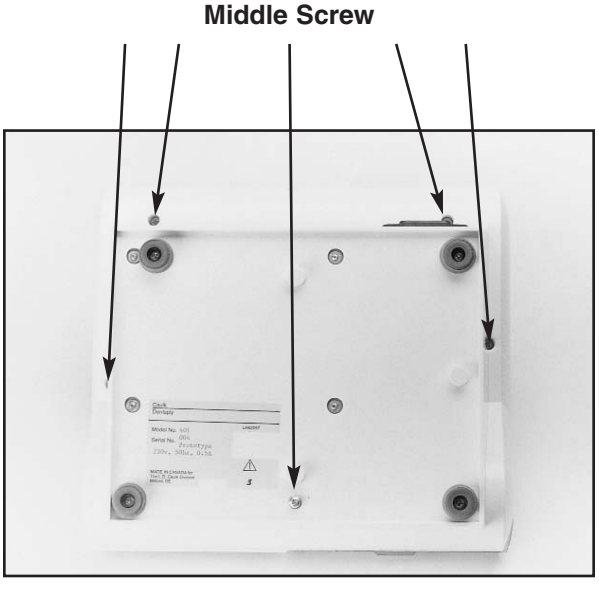

Figure 8.1

Assembly and disassembly procedure

(CAUTION: DISCONNECT POWER SOURCE FROM UNIT BEFORE ATTEMPTING ANY DISASSEMBLY OR REPAIR PROCEDURE)

8.1 ProMix™ Disassembly

a. Turn the unit upside down and completely loosen the 4 screws in the bottom half of the enclosure. (As shown in the Fig 8.1).
b. Remove the small screw in the middle of the unit to release the top cover (Fig 8.1).
c. Turn the unit right side up while holding the upper and lower halves of the enclosure. Carefully pull the top cover ahead in a sideward motion while pushing the arm through the rubber boot as shown in Fig 8.2.
d. Place the top cover beside the unit as shown in Fig 8.3.

8.1.1 Optical Detector Board Removal

a. Disconnect the lead wire assembly connection to the power supply.
b. Unscrew the 4 screws holding the PCB to the motor frame.
c. Take out the circuit board. (see Fig 8.4)

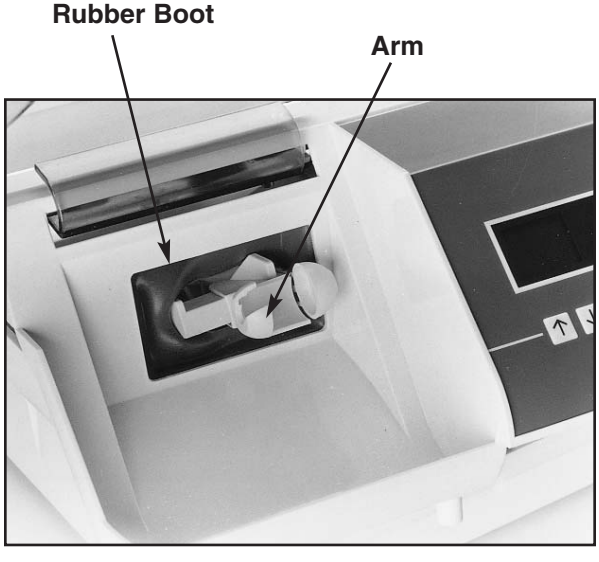

Figure 8.2

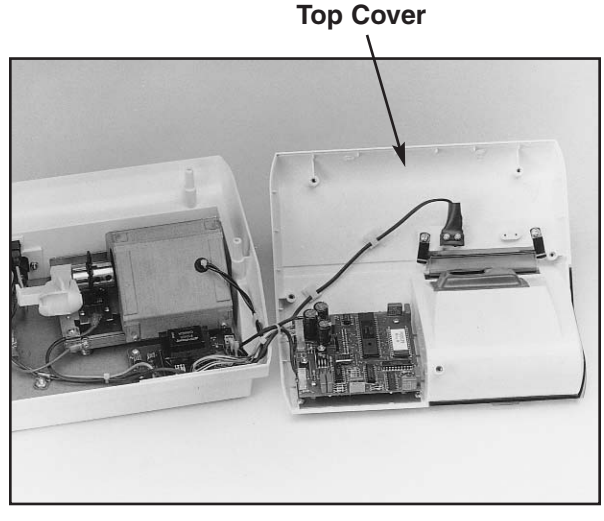

Figure 8.3

8.1.2 Power Supply Removal.

Model 400
120 Volt

a. 120v power supply removal. Disconect cable connection to CPU board at J1 and J3 (Fig 1d) Disconnect optical Detector board and door switch connections at power supply board J2 and J3 (Fig 3a).

Model 401, 402
230 Volt

a. 230v power supply removal. Disconnect cable connection to CPU board J1 (Fig 3b). Disconnect optical detector board at J2.
b. Remove power connection at the switch.
c. Remove motor lead connection at J1 blue terminal block.
d. Unscrew the four screws holding the power supply to the metal base.
e. Lift the transformer board up and out.

8.1.3 CPU Board Removal.

Model 400
120 Volt

a. Locate J1 and J2 connectors on the CPU board and disconnect.

Model 401, 402
230 Volt

a. Locate connectors J3 and J1 on the CPU board and disconnect.
b. Remove the 4 screws holding the CPU board to Display board.
c. Pull the CPU board up to disconnect it from the Display board (Display board and CPU board are connected by a 24 position board to board connector).

8.1.4 Display Board Removal.

a. Unscrew the 8 screws holding the display board to top plastic and lift the display board up and out.

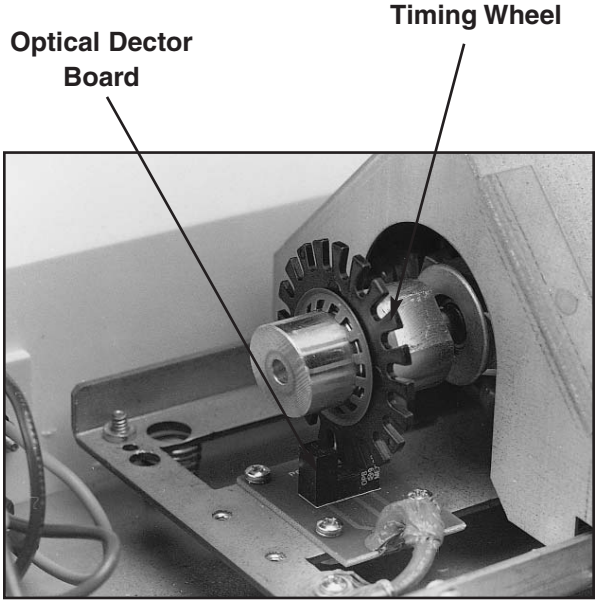

Figure 8.4

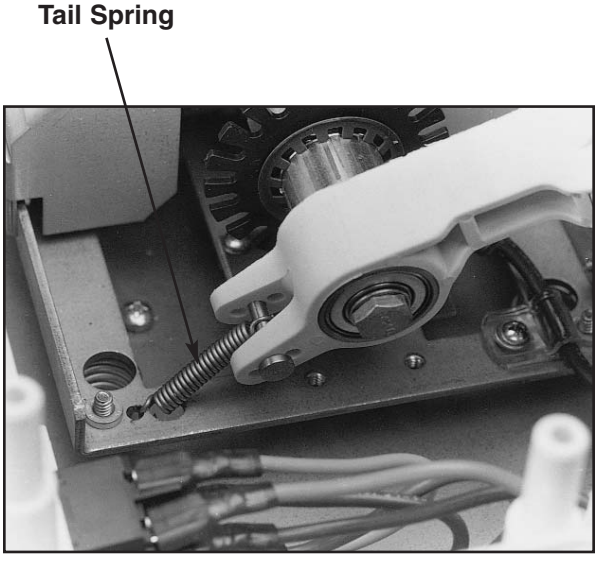

Figure 8.5

8.1.5 Tail Spring Assembly & Disassembly.

a. Cut the tail spring in the centre using a pair of wire cutters (Fig 8.5).
b. Remove the spring by unhooking from the arm assembly.
c. To replace the spring hook onto the arm first.

8.1.6 Arm Assembly & Disassembly.

a. Remove the arm holding spring (see section 8.1.5).
b. While holding the cam in place with a crescent wrench, remove the bolt holding the arm assembly onto the motor assembly.
c. Remove the arm assembly from the motor shaft.
d. To replace the arm assembly, reverse the above process.

8.1.7 Motor Assembly & Disassembly.

a. Remove the optical detector board as in section 8.1.1.
b. Remove the power supply as in section 8.1.2.
c. Remove the arm assembly as in section 8.1.6.
d. Remove the grounding straps by loosening the 2 nuts on the base plate grounding stud and the screw on the motor assembly.
e. Loosen the 2 allen screws on the cam assembly and pull the cam from the motor shaft.
f. Turn the unit upside down and completely loosen the 4 screws holding the rubber feet in place.
g. Turn the unit right side up and remove the 3 screws holding the base plate assembly in place.
h. Carefully pull the motor base plate assembly from the unit
i. To replace the motor reverse the above process.

8.1.8 Door switch assembly and disassembly.

Model 400
a. Disconnect the connector form J2 on the CPU board.

Model 401, 402
a. Disconnect the door switch from the power supply at connector J3.
b. Locate the door switch on the top cover assembly.
c. Remove the 2 screws holding the switch to the top cover assembly.
d. To replace the door switch assembly reverse the above process.

8.1.9 Door assembly and disassembly.

a. Locate the switch support on the top cover assembly and remove the 2 screws.
b. Carefully pull the door through the slot in the top cover.
c. To replace the door, repeat the above process.

COMPONENT LIST (Promix)

Model Dependent Components:

Component Description	**Model 400** *Part No.*	**Model 401** *Part No.*	**Model 402** *Part No.*
CPU Board	PM400001	PM401001	PM401001
Power Supply	PM400002	PM401002	PM401002
Optical Detector Board	PM400003	PM401003	PM401003
Door Switch Cable Assembly	PM400004	PM401004	PM401004
Motor Base Assembly	PM400005	PM401005	PM401005
Plastic Door	PM400006	PM401006	PM401006
Detachable Power Cord	M100024	M102024	M102024E M102024UK
Fuse (2)	PM400007	PM401007	PM401007
Plastic Enclosure (Top Cover including door)	PM400008	PM401008	PM401008

Universal Components

Component Description	*Part No.*
Plastic Enclosure (Bottom Cover)	PM400009
Display Board	PM400010
Arm Assembly	PM400011
Tail Spring	PM400012
Rubber Feet (4)	PM400013
Rubber Boot	PM400014
AC Receptacle	PM400015

NOTES

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